WHAT IS CLAIMED IS:

1. An amorphous computing system for computing seismic images, the system comprising:

a first amorphous hardware element;

a computer processor communicably coupled to the amorphous hardware element and to a computer readable medium, wherein the computer readable medium includes instructions executable by the computer processor to:

define a first plurality of hardware gates associated with the amorphous hardware element to form a first processing pipeline, wherein the first processing pipeline is operable to update a first seismic image point; and

define a second plurality of hardware gates associated with the amorphous hardware element to form a second processing pipeline, wherein the second processing pipeline is operable to update a second seismic image point independent of the first processing pipeline.

2. The system of claim 1, wherein the computer readable medium further includes a set of coefficients for a high frequency filter corresponding to a threshold noise frequency and a set of coefficients for a sinc filter.

3. The system of claim 2, wherein the first processing pipeline and the second processing pipeline include functions operable to implement at least some elements of a Kirchhoff algorithm, and wherein the functions include:

a first function, wherein the first function interpolates a velocity function to calculate a velocity at an image point;

a second function, wherein the second function utilizes the velocity to calculate a time of the data trace that contributes to the image point;

a third function, wherein the third function utilizes the time of the data trace to calculate a real sample number of the data trace, and wherein the real sample number of the data trace is a fractional offset from a whole sample number of the data trace;

a fourth function, wherein the fourth function filters a plurality of whole sample numbers of the data trace that straddle the real sample number of the data trace using the set of coefficients for a high frequency filter;

a fifth function, wherein the fifth function uses the set of coefficients for a sinc filter to interpolate the filtered plurality of whole number samples to the real sample number; and

a sixth function, wherein the sixth function sums the output of the fifth function into an output trace at the image point.

4. The system of claim 1, wherein the first processing pipeline and the second processing pipeline include functions operable to implement at least some elements of a Wave Equation, and wherein the functions include:

an update function, wherein the update function creates a set of simultaneous equations that will distribute energy from the data trace to a set of output image points located on an x,y,z coordinate grid;

a tri-diagonal solver function, wherein the tri-diagonal solver function solves the set of simultaneous functions; and

a thin lense adjustment function, wherein the thin lense adjustment function compensates for a lateral velocity gradient.

5. The system of claim 1, wherein the amorphous hardware element is a first field programmable gate array, and wherein the system further comprises:

a second field programmable gate array communicably coupled to the computer processor, wherein the computer readable medium further includes instructions executable by the computer processor to:

define a third plurality of hardware gates within the second field programmable gate array to form a third processing pipeline, wherein the third processing pipeline is operable to update a third seismic image point independent of the first processing pipeline and the second processing pipeline.

6. The system of claim 1, wherein the amorphous hardware element is a field programmable gate array; and wherein the computer processor is a reduced instruction set computer processor.

7. A method for processing seismic data traces within an amorphous hardware element, the method comprising:

providing an amorphous hardware element;

providing a computer processor communicably coupled to the amorphous hardware element and to a computer readable medium;

programming the amorphous hardware element; wherein programming the amorphous hardware element includes defining the amorphous hardware element to implement at least a portion of a seismic imaging algorithm.

8. The method of claim 7, wherein the at least a portion of the seismic imaging algorithm includes elements of Kirchhoff algorithm.

9. The method of claim 8, wherein the method further comprises:

providing a set of coefficients for a high frequency filter corresponding to a threshold noise frequency and a set of coefficients for a sinc filter.

10. The method of claim 9, wherein programming the amorphous hardware element includes defining a processing pipeline including functions operable to implement the elements of the Kirchhoff algorithm, and wherein the functions include:

a first function, wherein the first function interpolates a velocity function to calculate a velocity at an image point;

a second function, wherein the second function utilizes the velocity to calculate a time of the data trace that contributes to the image point;

a third function, wherein the third function utilizes the time of the data trace to calculate a real sample number of the data trace, and wherein the real sample number of the data trace is a fractional offset from a whole sample number of the data trace;

a fourth function, wherein the fourth function filters a plurality of whole sample numbers of the data trace that straddle the real sample number of the data trace using the set of coefficients for a high frequency filter;

a fifth function, wherein the fifth function uses the set of coefficients for a sinc filter to interpolate the filtered plurality of whole number samples to the real sample number; and

a sixth function, wherein the sixth function sums the output of the fifth function into an output trace at the image point.

11. The method of claim 7, wherein the at least a portion of the seismic imaging algorithm includes elements of Wave Equation.

12. The method of claim 11, wherein programming the amorphous hardware element includes defining a processing pipeline including functions operable to implement the elements of the Wave Equation, and wherein the functions include:

an update function, wherein the update function creates a set of simultaneous equations that will distribute energy from the data trace to a set of output image points located on an x,y,z coordinate grid;

a tri-diagonal solver function, wherein the tri-diagonal solver function solves the set of simultaneous functions; and

a thin lense adjustment function, wherein the thin lense adjustment function compensates for a lateral velocity gradient.

13. The method of claim 7, wherein programming the amorphous hardware element comprises defining a plurality of hardware gates within the amorphous hardware element to form at least one processing pipeline.

14. The method of claim 7, wherein programming the amorphous hardware element comprises defining a first plurality of hardware gates within the amorphous hardware element to form a first processing pipeline, and defining a second plurality of hardware gates within the amorphous hardware element to form a second processing pipeline.

15. The method of claim 14, wherein the first processing pipeline is operable to update a first seismic image point, and the second processing pipeline is operable to update a second seismic image point.

16. The method of claim 15, wherein the first processing pipeline operates independent of the second processing pipeline.

17. The method of claim 7, wherein the amorphous hardware element is a field programmable gate array; and wherein the computer processor is a reduced instruction set computer processor.

18. The method of claim 7, wherein programming the amorphous hardware element comprises defining a plurality of hardware gates within the amorphous hardware element to form a plurality of processing pipelines, and wherein each of the

respective processing pipelines within the plurality of processing pipelines is operable to update a seismic image point in parallel to others of the respective processing pipelines.

19. The method of claim 7, wherein the amorphous hardware element is included within a first field programmable gate array, and wherein programming the amorphous hardware element comprises defining a first plurality of hardware gates within the field programmable gate array to form a first processing pipeline, the method further comprising:

providing a second amorphous hardware element communicably coupled to the computer processor; and

programming the second amorphous hardware element, wherein programming the second amorphous hardware element comprises defining a second plurality of hardware gates within the field programmable gate array to form another processing pipeline.

20. A system for implementing a Kirchhoff algorithm, the system comprising:

a field programmable gate array;

a computer processor communicably coupled to the field programmable gate array and to a computer readable medium, wherein the computer readable medium includes a set of coefficients for a high frequency filter corresponding to a threshold noise frequency and a set of coefficients for a sinc filter, and instructions executable by the computer processor to:

define a first plurality of hardware gates within the field programmable gate array to form a first processing pipeline, wherein the first processing pipeline is operable to update a first seismic image point, and wherein the first processing pipeline implements the following functions:

a first function, wherein the first function interpolates a velocity function to calculate a velocity at an image point;

a second function, wherein the second function utilizes the velocity to calculate a time of the data trace that contributes to the image point;

a third function, wherein the third function utilizes the time of the data trace to calculate a real sample number of the data trace, and wherein the real sample number of the data trace is a fractional offset from a whole sample number of the data trace;

a fourth function, wherein the fourth function filters a plurality of whole sample numbers of the data trace that straddle the real sample number of the data trace using the set of coefficients for a high frequency filter;

a fifth function, wherein the fifth function uses the set of coefficients for a sinc filter to interpolate the filtered plurality of whole number samples to the real sample number;

a sixth function, wherein the sixth function sums the output of the fifth function into an output trace at the image point;

define a second plurality of hardware gates within the field programmable gate array to form a second processing pipeline, wherein the second processing pipeline is operable to update a second seismic image point independent of the first processing pipeline, and wherein the second processing pipeline implements the following functions:

the first function, wherein the first function interpolates a velocity function to calculate a velocity at an image point;

the second function, wherein the second function utilizes the velocity to calculate a time of the data trace that contributes to the image point;

the third function, wherein the third function utilizes the time of the data trace to calculate a real sample number of the data trace, and wherein the real sample number of the data trace is a fractional offset from a whole sample number of the data trace;

the fourth function, wherein the fourth function filters a plurality of whole sample numbers of the data trace that straddle the real sample number of the data trace using the set of coefficients for a high frequency filter;

the fifth function, wherein the fifth function uses the set of coefficients for a sinc filter to interpolate the filtered plurality of whole number samples to the real sample number; and

the sixth function, wherein the sixth function sums the output of the fifth function into an output trace at the image point.